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(54) PRODUCTION OF OXIDE SUPERCONDUCTING FILM

(57)Abstract:

POSE: To prevent the generation of foam in a superconducting film by forming a raw material solution layer for a superconducting film on a substrate, drying to obtain a gel layer and irradiating with infrared pulses, thereby affecting stepwise thermal degradation from the surface of the gel layer toward the inner layers.

CONSTITUTION: Organometallic compounds to be used as raw materials such as yttrium acetate, barium acetate and copper acetate, etc., are dissolved in an organic solvent (e.g. hot propionic acid) at molar ratios corresponding to the composition of an oxide superconductor such as Re-Ba-Cu-O superconductor (Re is rare earth element). A substrate such as a polycrystalline MgO is immersed in the solvent solution and pulled out of the solution to form a solution layer on the substrate. The layer is dried in vacuum and the obtained gel layer is irradiated with a prescribed number of infrared pulses to effect the stepwise thermal degradation of the gel layer from the surface toward the inner layer at 200-900° C. The generation of gas in the layer is suppressed by this process. The decomposed product is sintered at 800-960° C in O₂ atmosphere and annealed at 300-600° C to obtain an oxide superconducting film having excellent superconducting characteristics.

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